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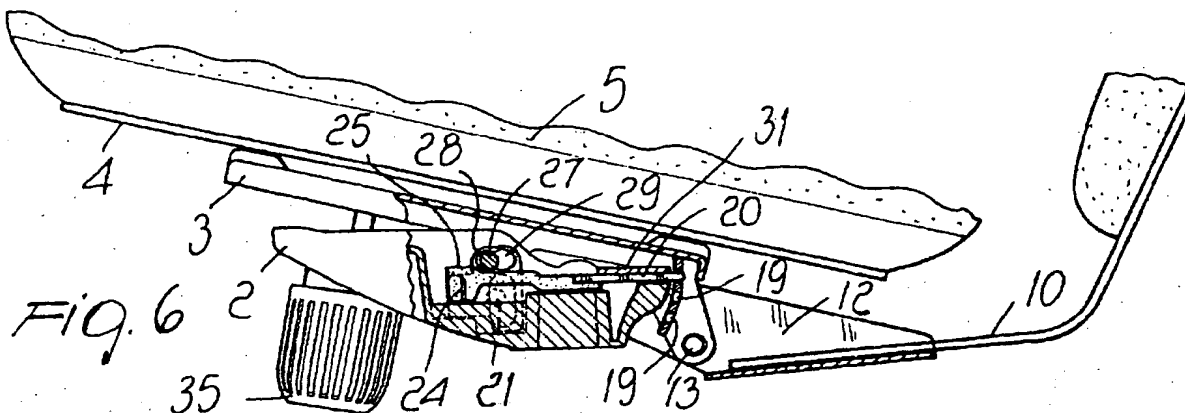
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(54) **Device for the synchronized adjustment of the position of the seat and back of a chair**

(57) A device for the synchronized adjustment of the position of the seat and back of a chair, comprising a box-like body (2) which is adapted to support a first element (3) for supporting a seat (4) of the chair and also comprising a second supporting element (12) which is adapted to support the back (10) of the chair and is articulated to the first supporting element (3) and to the box-like body (2); the device also comprises means (20) for mutually engaging the box-like body (2) and a curved

plate-like element (31) which is provided at one end of the first supporting element (3) and in which a plurality of slots (19) are formed which are adapted to engage the engagement means (20), the engagement means and the slots being arranged in a mutually staggered position, so as to allow adjustment of the back (10) in a plurality of mutually closely spaced positions.



Description

[0001] The present invention relates to a device for the synchronized adjustment of the position of the seat and back of a chair.

[0002] It is known that chairs of the type used in offices or the like are formed by a seat which is supported by a column which ends, at the opposite end, with a base with a plurality of spokes which is adapted to rest on the ground.

[0003] In order to adjust the seat and the back there are actuation devices which allow both to vertically adjust the seat with respect to the base and to adjust the inclination of the back with respect to the seat.

[0004] Conventional devices accordingly have a mechanism which is adapted to vary the position of the back, i.e., its inclination with respect to the seat of the chair. This mechanism has, for example, a rack which allows the engagement of a tooth which allows the back to recline in a plurality of positions with respect to the seat.

[0005] However, conventional chairs suffer the drawback that the variation in the inclination of the back with respect to the seat does not occur in a fully gradually adjustable manner because the number of notches that allow to adjust the position of the back is limited by the space available inside the back tilting mechanism and therefore the possibilities of adjustment are limited for the user.

[0006] This can create difficulty for the user in finding the position of the back adapted for his needs.

[0007] The aim of the present invention is therefore to provide a device for the synchronized adjustment of the position of the seat and back of a chair which provides a plurality of positions that said back can assume, allowing a smooth transition from one position to the other.

[0008] Within the scope of this aim, an object of the present invention is to provide a device for the synchronized adjustment of the position of the seat and back of a chair in which the device has means for stably locking the inclination reached by the back with respect to the base of the chair.

[0009] Another object of the present invention is to provide a device for the synchronized adjustment of the position of the seat and back of a chair which is highly reliable, relatively easy to manufacture and at competitive costs.

[0010] This aim, these objects and others which will become apparent hereinafter are achieved by a device for the synchronized adjustment of the position of the seat and back of a chair, comprising a box-like body which is adapted to support a first element for supporting a seat of the chair and also comprising a second supporting element which is adapted to support the back of the chair and is articulated to the first supporting element and to said box-like body, characterized in that it comprises means for mutually engaging said box-like body and a curved plate-like element which is provided

at one end of said first supporting element and in which a plurality of slots are formed which are adapted to engage said engagement means, said engagement means and said slots being arranged in a mutually staggered position, so as to allow adjustment of said back in a plurality of mutually closely spaced positions.

[0011] Further characteristics and advantages of the invention will become apparent from the description of a preferred embodiment of the device according to the invention, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is an exploded perspective view of the device according to the present invention;

Figure 2 is a front view of the device according to the present invention;

Figure 3 is a partially sectional plan view of the device according to the present invention, shown in a first operating position;

Figure 4 is a partially sectional plan view of the device according to the present invention, shown in a second operating position;

Figure 5 is a sectional side view of the device according to the present invention, shown in the first operating position, which corresponds to the position shown in Figure 3; and

Figure 6 is a sectional side view of the device according to the present invention, illustrated in the second operating position, which corresponds to the one shown in Figure 4.

[0012] With reference to the above Figures, the device according to the present invention, generally designated by the reference numeral 1, comprises a box-like body 2 for supporting the seat and the back.

[0013] In particular, the box-like body 2 has a supporting element 3 which is hinged at an intermediate point of said body and is meant to support a seat 4 on which there is a padding 5 in order to improve the comfort of the user when sitting.

[0014] The point where the supporting element 3 is pivoted to the box-like body 2 is designated by the reference numeral 27 in Figures 5 and 6, as described hereinafter.

[0015] A second supporting element 12, meant to support a back 10 of the chair, is pivoted to the first supporting element 3, which supports the seat 4, and to the box-like body 2. The pivoting of the second supporting element 12 to the first supporting element 3 is designated by the reference numeral 13, while the pivoting of the second supporting element 12 to the box-like body is not shown in the Figures and occurs in any case within the box-like body 2.

[0016] The first supporting element 3 is provided with a pair of shoulders 14 and 15, at the end of which there are holes 16 and 17 which allow to pivot the supporting element 3 to the second supporting element 12 at the point 13.

[0017] A substantially curved plate-like element 18 is arranged between the pair of shoulders 14 and 15 and is provided with a plurality of slots 19 which are arranged on two side-by-side rows so that the slots 19 of one row are staggered with respect to the slots of the adjacent row.

[0018] The box-like body 2 contains engagement means which are adapted to engage the slots 19 in order to lock the back 10 in the various positions with respect to the base of the chair.

[0019] Since the back 10 is articulated to the seat 4, tilting the back also entails tilting the seat with respect to the surface on which the chair rests.

[0020] In particular, the engagement means accommodated in the box-like body 2 are constituted by at least one bolt 20 which is adapted to engage one of the slots 19 formed in the curved plate-like element 18 of the first supporting element 3.

[0021] In detail, preferably there are two bolts 20 which can be actuated so as to engage said slots 19.

[0022] A plate-like element 31 is arranged above the pair of bolts so as to prevent their lifting and thus allow their guided translatory motion.

[0023] The bolts 20 are actuated by means of a lever 21 for vertically adjusting the seat 4 of the chair.

[0024] The rotation of the lever about its own axis in fact allows to actuate a mechanism 22 which applies pressure to the underlying pneumatic cylinder, not shown, which allows to vertically adjust the seat 4 of the chair.

[0025] In another movement of the lever 21, i.e., in a movement performed on a plane which is parallel to the base of the chair, the lever 21 pushes the bolts 20, which accordingly alternately engage the slots 19.

[0026] In particular, the thrust of the lever 21 is applied by means of a pusher 23 with which a lamina 24 is associated; said lamina lies transversely with respect to the pusher 23 and is engaged, at its respective ends, with a pair of actuation bars 25 and 26 which are rigidly coupled to the bolts 20.

[0027] The locking pin 27, arranged transversely with respect to the longitudinal extension of the box-like body 2, in addition to providing the pivoting between the element 3 and the body 2, is inserted in a pair of holes 28 and 29 which are mutually connected by a narrower region provided on the pusher 23 in order to act as retention element.

[0028] In a conventional manner, the adjustment of the force that contrasts the synchronous tilting of the back and of the seat 4 is provided by virtue of elastic means 30 which are compressed by means of a knob 35 and a rod-like element 36.

[0029] The operation of the device according to the present invention is now described with reference to Figures 3 to 6.

[0030] In the inactive position, shown in Figures 3 and 5, the back 10 and the seat 4 are in the positions shown respectively in the Figures and the bolts 20 are disen-

gaged from the respective slots 19 of the curved plate-like element 18.

[0031] Following an action applied by the user by means of the lever 21 of the chair, by producing a combined and synchronized movement of the back with the seat, the second supporting element 12 is made to tilt with respect to the position that it assumes when inactive; this inclination allows the curved plate-like element 18, rigidly coupled to the first supporting element 3, to perform a downward rotation, allowing the engagement of the bolts 20 in the respective slots 19.

[0032] In particular, the engagement movement of the bolts 20 is provided by the actuation of the lever 21, which acts, by means of the pusher 23 and the lamina 24, on the pair of bars 25 and 26, which in turn, by being rigidly coupled to the bolts 20, allow said bolts to be pushed forward and thus protrude from the edge of the box-like body toward the back of the chair and thus engage the slots 19.

[0033] Since the slots 19 are arranged in two side-by-side mutually staggered rows, only one of the bolts 20 engages a slot 19, while the other one necessarily abuts against the curved plate-like element 18.

[0034] In this manner there is a much wider range of adjustment for the inclination of the back 10 than if the slots 19 were not mutually staggered.

[0035] In this case, owing to the small dimensions of the curved plate-like element 8 and in general owing to the limited space available below the seat 4, the positions that can be assumed by the back 10 would necessarily be limited, since the mechanical strength of the curved plate-like element 18 would be compromised if the slots 19 were arranged closely adjacent to each other.

[0036] According to the invention, instead, the staggering of the slots 19, arranged in two side-by-side rows, allows to drastically increase the number of positions that the back can assume, without thereby weakening the mechanical strength of the curved plate-like element 18.

[0037] Accordingly, as mentioned, only one of the bolts 20 engages one of the slots 19, while the other one abuts against the curved element 18.

[0038] The bolt 20 is kept in abutment against the curved plate-like element 18 by the elasticity of the lamina 24, which also acts as a return spring.

[0039] The movement of the lever 21 on the plane that lies parallel to the box-like body 2 therefore allows to actuate the bolts 20 to adjust the inclination of the back 10.

[0040] Since the back 10 tilts, the seat 4, which is articulated thereto, also tilts, raising its free front edge with respect to the surface on which the seat rests.

[0041] The actuation of the lever 21 also allows the pivot 27 to perform a translatory motion within the holes 28 and 29 of the pusher 23, so as to lock in position the bolts 20 in the slot 19 and in abutment against the curved plate-like element 18, respectively.

[0042] In practice it has been observed that the device according to the invention fully achieves the intended aim, since it allows to gradually adjust at will the inclination of the back of the chair in step with the seat, ensuring a plurality of inclination positions, so that the inclination of the back becomes substantially continuous without appreciable steps.

[0043] The device thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the inventive concept.

[0044] Thus, for example, the bolts 20 are shown arranged on the same plane, while the slots 19 are shown in two side-by-side rows and are staggered in one row with respect to the other.

[0045] As an alternative, it is possible to mutually stagger the bolts 20, thus arranging them on two parallel planes, and instead keep the slots 19 mutually aligned and the two rows of slots 19 mutually aligned.

[0046] In this manner, the bolts 20 in any case engage the slots 19 so as to allow to obtain the same adjustment of the back that is obtained when the bolts 20 are mutually aligned, i.e., arranged on the same plane, while the slots 19 are staggered.

[0047] Finally, all the elements may be replaced with other technically equivalent ones.

[0048] In practice, the materials used, so long as they are compatible with the specific use, as well as the dimensions, may be any according to requirements and to the state of the art.

[0049] The disclosures in Italian Patent Application No. MI98A000966 from which this application claims priority are incorporated herein by reference.

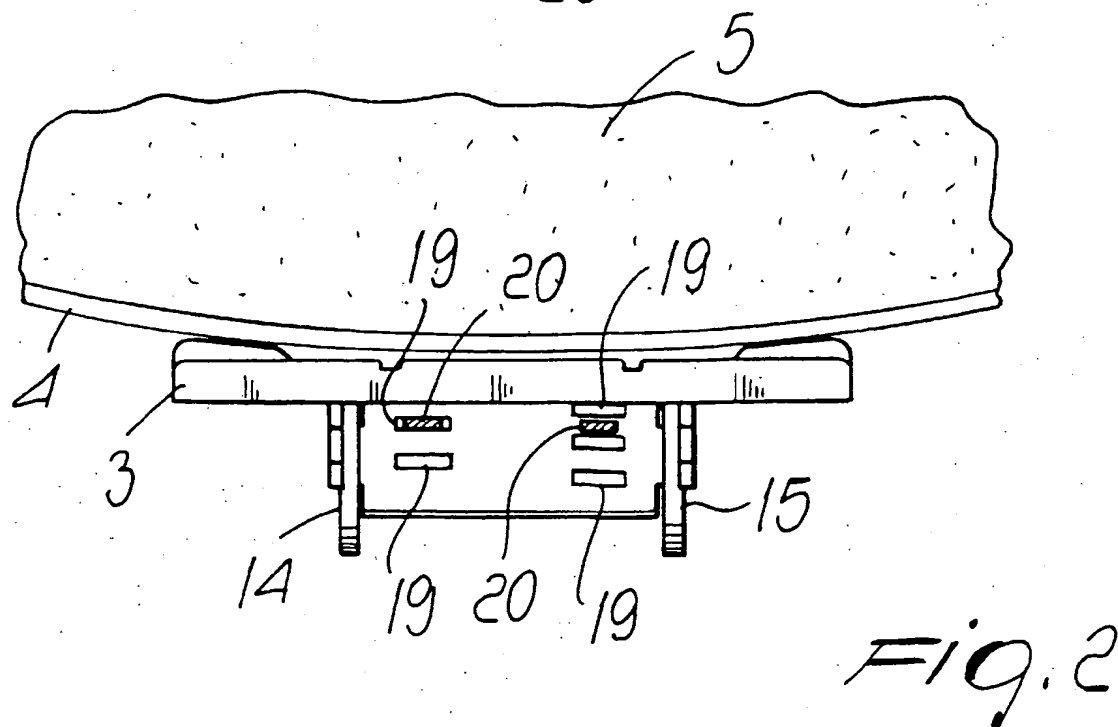
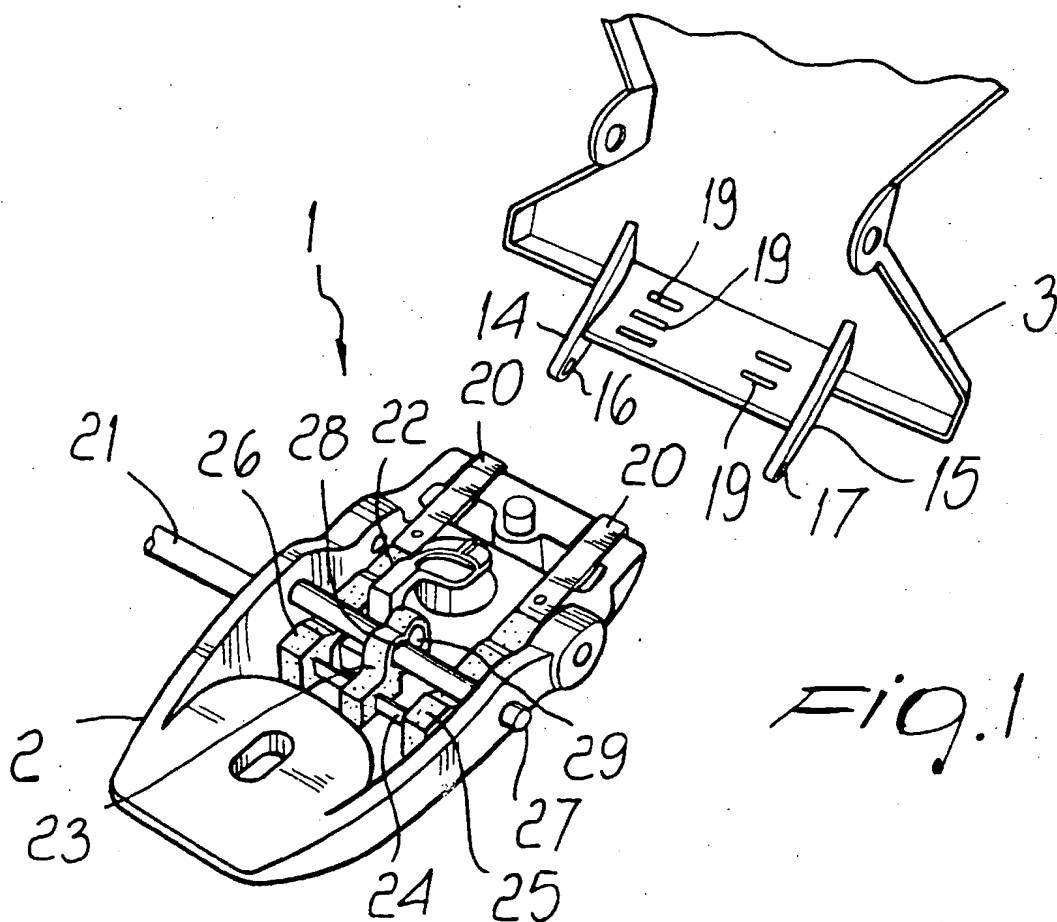
[0050] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A device for the synchronized adjustment of the position of the seat and back of a chair, comprising a box-like body which is adapted to support a first element for supporting a seat of the chair and also comprising a second supporting element which is adapted to support the back of the chair and is articulated to the first supporting element and to said box-like body, characterized in that it comprises means for mutually engaging said box-like body and a curved plate-like element which is provided at one end of said first supporting element and in which a plurality of slots are formed which are adapted to engage said engagement means, said engagement means and said slots being arranged in a mutually staggered position, so as to allow the adjustment of said back in a plurality of

mutually closely spaced positions.

2. The device according to claim 1, characterized in that said slots are arranged in two mutually staggered side-by-side rows.
3. The device according to claim 1, characterized in that said engagement means comprise at least one bolt which is adapted to engage one of said slots.
4. The device according to claim 3, characterized in that said engagement means comprise two bolts which are arranged on a same plane and are adapted to engage said slots.
5. The device according to claim 3, characterized in that said engagement means comprise a pair of bolts which are arranged on mutually different planes and are adapted to engage said slots, which are arranged in mutually parallel rows.
6. The device according to one or more of the preceding claims, characterized in that said engagement means also comprise a pusher which is accommodated within said box-like body and is actuated by a lever which protrudes from said box-like body, said pusher having, at one end, a lamina which is adapted to engage, at its ends, a pair of bars which are rigidly coupled to said bolts.
7. The device according to one or more of the preceding claims, characterized in that said pusher has a pair of holes which are mutually connected by a narrower region and are adapted to allow the passage of a locking pivot which is arranged transversely to said box-like body.
8. The device according to one or more of the preceding claims, characterized in that said lever can be actuated about its own axis, in order to provide vertical adjustment of the seat with respect to the back, and on a plane which is parallel to the surface on which said seat rests, in order to adjust the inclination of the back of the seat.
9. The device according to one or more of the preceding claims, characterized in that said lamina is resilient.
10. The device according to one or more of the preceding claims, characterized in that it comprises resilient contrast means for the synchronized tilting of the back and of the seat.



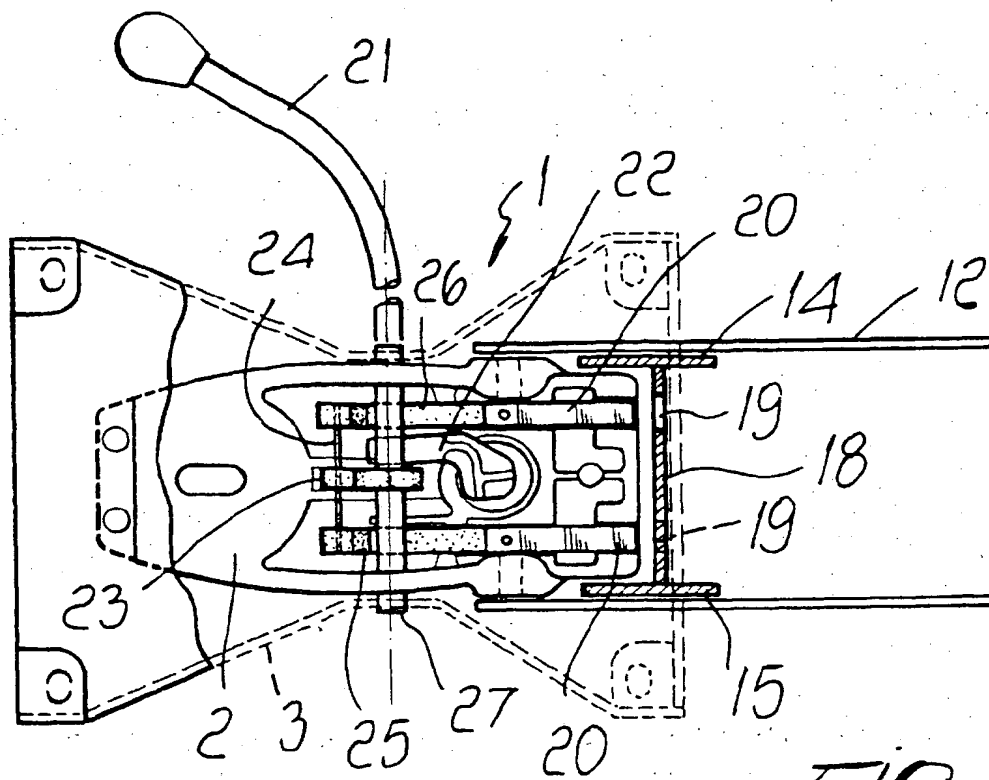


FIG. 3

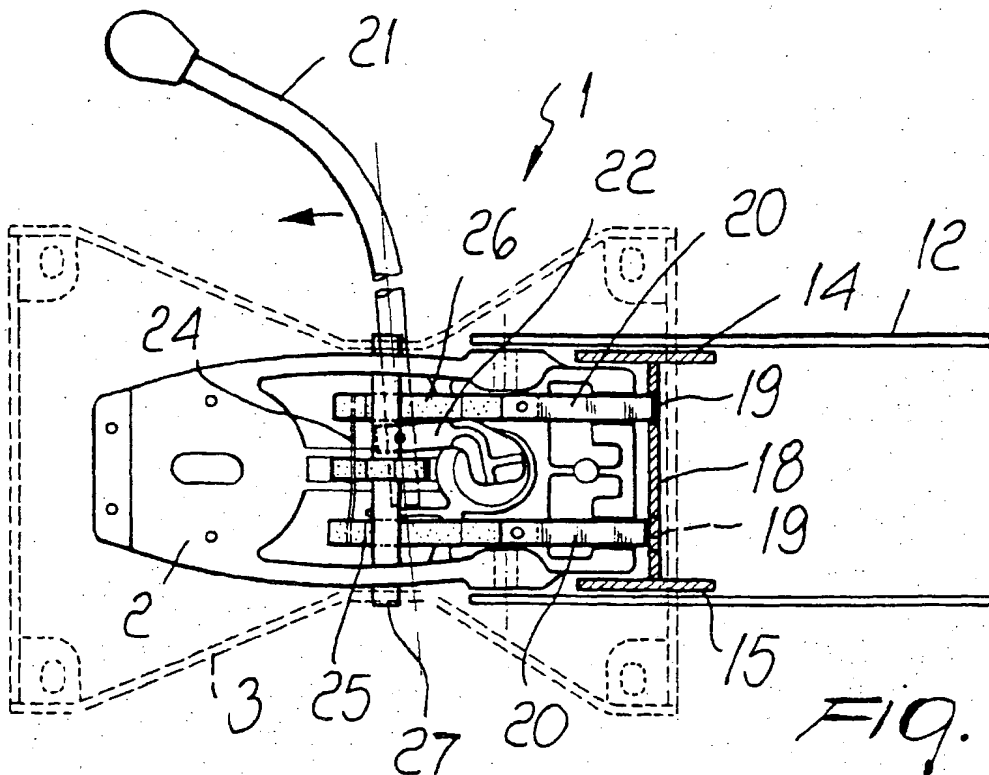
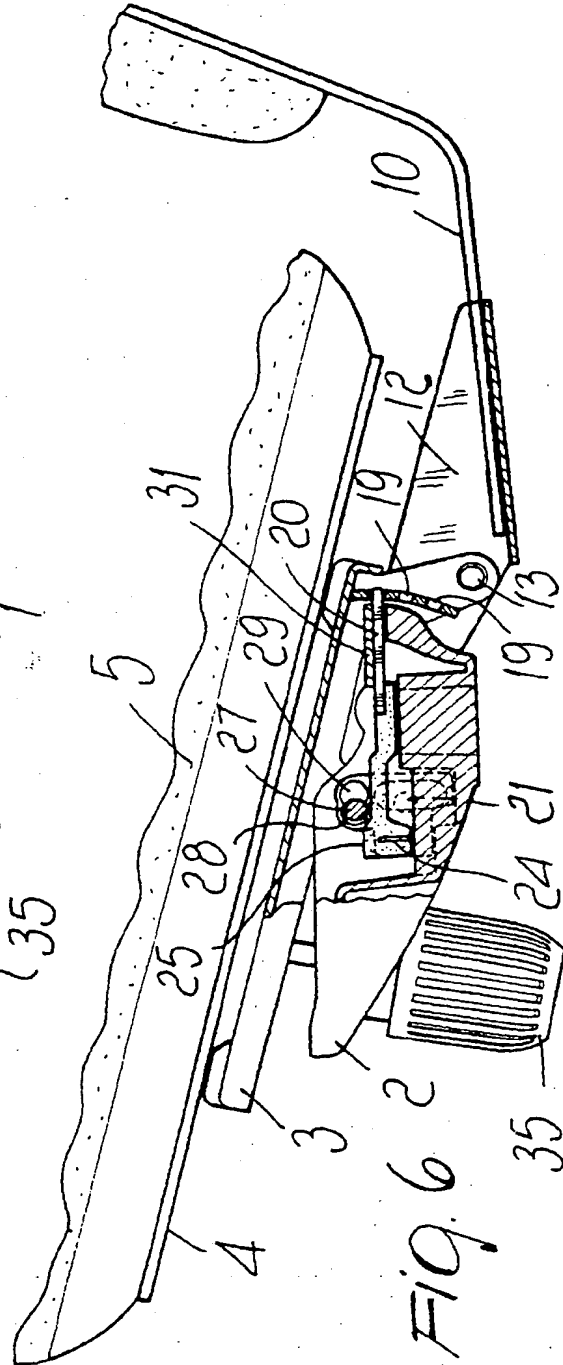
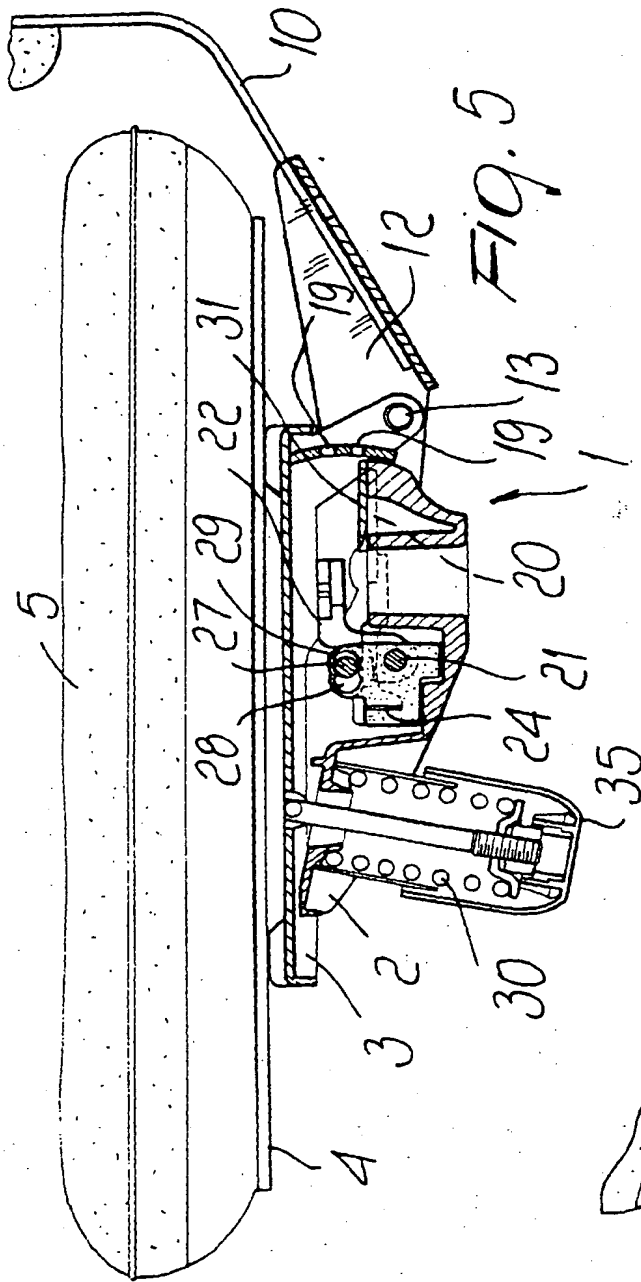
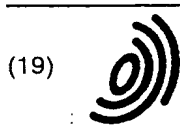


FIG. 4





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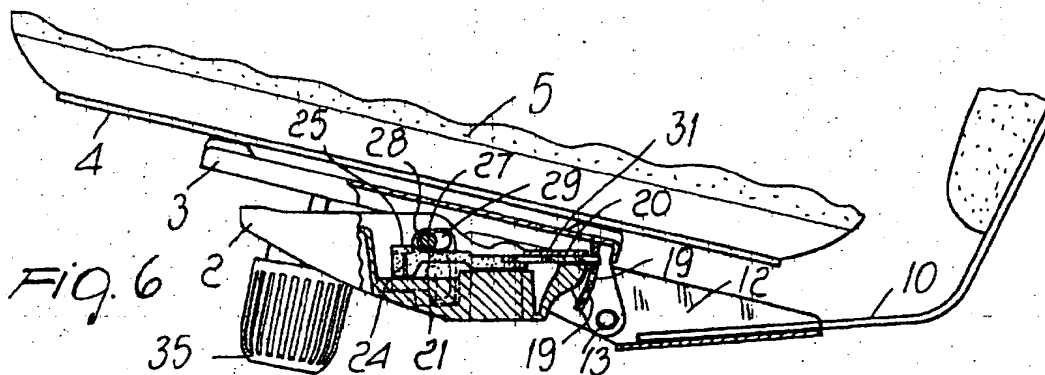
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EUROPEAN SEARCH REPORT

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			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 2 October 2000	Examiner van Bilderbeek, H.
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
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